

WHAT IS CLAIMED IS:

1. An interlayer insulating film comprising:

a polymer in which a first monomer having a substituted acetylenyl group and polymerizable in the three-dimensional direction and a second monomer having a substituted cyclopentanonyl group and polymerizable in the two-dimensional direction are three-dimensionally polymerized.

2. The interlayer insulating film of Claim 1,

wherein said first monomer is an adamantane derivative having a substituted acetylenyl group.

3. The interlayer insulating film of Claim 1,

wherein said first monomer is a methane derivative having a substituted acetylenyl group.

4. The interlayer insulating film of Claim 1,

wherein said second monomer is an aromatic derivative having a substituted cyclopentanonyl group.

5. An interlayer insulating film comprising:

a polymer in which a first monomer having a substituted acetylenyl group and polymerizable in the two-dimensional direction and a second monomer having a substituted cyclopentanonyl group and polymerizable in the three-dimensional direction are three-dimensionally polymerized.

6. The interlayer insulating film of Claim 5,

wherein said first monomer is an aromatic derivative having a substituted acetylenyl group.

7. The interlayer insulating film of Claim 5,

wherein said second monomer is an adamantane derivative having a substituted

cyclopentanonyl group.

8. The interlayer insulating film of Claim 5,

wherein said second monomer is a methane derivative having a substituted cyclopentanonyl group.

5 9. A method for forming an interlayer insulating film comprising the steps of:

preparing an oligomer by polymerizing, in a liquid phase, a first monomer having a substituted acetylenyl group and polymerizable in the three-dimensional direction and a second monomer having a substituted cyclopentanonyl group and polymerizable in the two-dimensional direction; and

10 causing polymerization after applying said oligomer on a substrate, whereby forming an interlayer insulating film made from a polymer in which said first monomer and said second monomer are three-dimensionally polymerized.

10. The method for forming an interlayer insulating film of Claim 9,

15 wherein said first monomer is an adamantane derivative having a substituted acetylenyl group.

11. The method for forming an interlayer insulating film of Claim 9,

wherein said first monomer is a methane derivative having a substituted acetylenyl group.

12. The method for forming an interlayer insulating film of Claim 9,

20 wherein said second monomer is an aromatic derivative having a substituted cyclopentanonyl group.

13. The method for forming an interlayer insulating film of Claim 9,

wherein a substituent of said substituted acetylenyl group is an aromatic derivative.

25 14. The method for forming an interlayer insulating film of Claim 13,

wherein said aromatic derivative is benzene, naphthalene, anthracene or biphenyl.

15. The method for forming an interlayer insulating film of Claim 9,

wherein a substituent of said substituted cyclopentanonyl group is an aromatic derivative.

16. The method for forming an interlayer insulating film of Claim 15,

wherein said aromatic derivative is benzene, naphthalene, anthracene or biphenyl.

17. A method for forming an interlayer insulating film comprising the steps of:

preparing an oligomer by polymerizing, in a gas phase, a first monomer having a substituted acetylenyl group and polymerizable in the three-dimensional direction and a second monomer having a substituted cyclopentanonyl group and polymerizable in the two-dimensional direction; and

causing polymerization after depositing said oligomer on a substrate, whereby forming an interlayer insulating film made from a polymer in which said first monomer and said second monomer are three-dimensionally polymerized.

18. The method for forming an interlayer insulating film of Claim 17,

wherein polymerization performed in a gas phase for preparing said oligomer is a thermal polymerization reaction.

19. The method for forming an interlayer insulating film of Claim 17,

wherein polymerization performed in a gas phase for preparing said oligomer is a plasma polymerization reaction.

20. The method for forming an interlayer insulating film of Claim 17,

wherein said first monomer is an adamantane derivative having a substituted acetylenyl group.

21. The method for forming an interlayer insulating film of Claim 17,

wherein said first monomer is a methane derivative having a substituted

acetylenyl group.

22. The method for forming an interlayer insulating film of Claim 17,

wherein said second monomer is an aromatic derivative having a substituted cyclopentanonyl group.

5 23. The method for forming an interlayer insulating film of Claim 17,

wherein a substituent of said substituted acetylenyl group is an aromatic derivative.

24. The method for forming an interlayer insulating film of Claim 23,

wherein said aromatic derivative is benzene, naphthalene, anthracene or biphenyl.

10 25. The method for forming an interlayer insulating film of Claim 17,

wherein a substituent of said substituted cyclopentanonyl group is an aromatic derivative.

26. The method for forming an interlayer insulating film of Claim 25,

wherein said aromatic derivative is benzene, naphthalene, anthracene or biphenyl.

15 27. A method for forming an interlayer insulating film comprising the steps of:

preparing an oligomer by polymerizing, in a liquid phase, a first monomer having a substituted acetylenyl group and polymerizable in the two-dimensional direction and a second monomer having a substituted cyclopentanonyl group and polymerizable in the three-dimensional direction; and

20 causing polymerization after applying said oligomer on a substrate, whereby forming an interlayer insulating film made from a polymer in which said first monomer and said second monomer are three-dimensionally polymerized.

28. The method for forming an interlayer insulating film of Claim 27,

25 wherein said first monomer is an aromatic derivative having a substituted acetylenyl group.

29. The method for forming an interlayer insulating film of Claim 27,
wherein said second monomer is an adamantane derivative having a substituted
cyclopentanonyl group.

30. The method for forming an interlayer insulating film of Claim 27,
wherein said second monomer is a methane derivative having a substituted
cyclopentanonyl group.

31. The method for forming an interlayer insulating film of Claim 27,
wherein a substituent of said substituted acetylenyl group is an aromatic
derivative.

32. The method for forming an interlayer insulating film of Claim 31,
wherein said aromatic derivative is benzene, naphthalene, anthracene or biphenyl.

33. The method for forming an interlayer insulating film of Claim 27,
wherein a substituent of said substituted cyclopentanonyl group is an aromatic
derivative.

34. The method for forming an interlayer insulating film of Claim 33,
wherein said aromatic derivative is benzene, naphthalene, anthracene or biphenyl.

35. A method for forming an interlayer insulating film comprising the steps of:
preparing an oligomer by polymerizing, in a gas phase, a first monomer having a
substituted acetylenyl group and polymerizable in the two-dimensional direction and a
second monomer having a substituted cyclopentanonyl group and polymerizable in the
three-dimensional direction; and

causing polymerization after depositing said oligomer on a substrate, whereby
forming an interlayer insulating film made from a polymer in which said first monomer
and said second monomer are three-dimensionally polymerized.

36. The method for forming an interlayer insulating film of Claim 35,

wherein polymerization performed in a gas phase for preparing said oligomer is a thermal polymerization reaction.

37. The method for forming an interlayer insulating film of Claim 35,
wherein polymerization performed in a gas phase for preparing said oligomer is a
5 plasma polymerization reaction.

38. The method for forming an interlayer insulating film of Claim 35,
wherein said first monomer is an aromatic derivative having a substituted
acetylenyl group.

39. The method for forming an interlayer insulating film of Claim 35,
10 wherein said second monomer is an adamantane derivative having a substituted
cyclopentanonyl group.

40. The method for forming an interlayer insulating film of Claim 35,
wherein said second monomer is a methane derivative having a substituted
cyclopentanonyl group.

41. The method for forming an interlayer insulating film of Claim 35,
15 wherein a substituent of said substituted acetylenyl group is an aromatic
derivative.

42. The method for forming an interlayer insulating film of Claim 41,
wherein said aromatic derivative is benzene, naphthalene, anthracene or biphenyl.

43. The method for forming an interlayer insulating film of Claim 35,
20 wherein a substituent of said substituted cyclopentanonyl group is an aromatic
derivative.

44. The method for forming an interlayer insulating film of Claim 43,
wherein said aromatic derivative is benzene, naphthalene, anthracene or biphenyl.

45. A polymer composition comprising a first monomer having a substituted
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acetylenyl group and polymerizable in the three-dimensional direction and a second monomer having a substituted cyclopentanonyl group and polymerizable in the two-dimensional direction, said first monomer and said second monomer being three-dimensionally polymerized.

5 46. The polymer composition of Claim 45,
 wherein said first monomer is an adamantane derivative having a substituted acetylenyl group or a methane derivative having a substituted acetylenyl group.

 47. The polymer composition of Claim 45,
 wherein said second monomer is an aromatic derivative having a substituted
10 cyclopentanonyl group.

 48. A polymer composition comprising a first monomer having a substituted acetylenyl group and polymerizable in the two-dimensional direction and a second monomer having a substituted cyclopentanonyl group and polymerizable in the three-dimensional direction, said first monomer and said second monomer being
15 three-dimensionally polymerized.

 49. The polymer composition of Claim 48,
 wherein said first monomer is an aromatic derivative having a substituted acetylenyl group.

 50. The polymer composition of Claim 48,
20 wherein said second monomer is an adamantane derivative having a substituted cyclopentanonyl group or a methane derivative having a substituted cyclopentanonyl group.